

CLAIMS

1. Water-redispersible granules

characterized in that they can be obtained by carrying out the following steps:

5 - an emulsion, in water, of at least one active substance, at least one nonionic surfactant, and at least one water-soluble or water-dispersible compound is prepared,

- the emulsion thus obtained is dried;

10 and characterized in that:

- the active substance is in the form of a hydrophobic liquid,

- the nonionic surfactant is chosen from polyoxyalkylenated derivatives,

15 - the water-soluble or water-dispersible compound is:

(i) at least one polymer obtained by polymerizing at least one monomer (I), at least one monomer (III) and optionally at least one monomer (II) or at least one monomer (I) and at least one monomer (II'), the said monomers corresponding to the following:

20 o (I) : ethylenically unsaturated, linear or branched, aliphatic, cyclic or aromatic monocarboxylic or polycarboxylic acid, or anhydride,

- o (II) : ethylenically unsaturated, linear or branched hydrocarbon monomer;
- o (II') : $(R^2)(R^2)-C=CH_2$ (II'); in which formula the radicals R^2 , which are identical or different, represent a hydrogen atom, a linear or branched aliphatic, or cyclic, saturated or ethylenically unsaturated, C_2-C_{10} radical, provided that the two radicals R^2 are not hydrogen atoms;
- o (III): polyoxyalkylenated ester of an ethylenically unsaturated carboxylic acid;

(ii) at least one polymer derived from the polymerization of at least one ethylenically unsaturated (linear or branched, aliphatic, cyclic or aromatic, monocarboxylic or polycarboxylic acid, or anhydride, monomer (I) and comprising, in addition, at least one saturated or unsaturated, aromatic or nonaromatic, hydrophobic C_4-C_{30} hydrocarbon graft, optionally interrupted by one or more heteroatoms;

(iii) the polypeptides of natural or synthetic origin, comprising at least one saturated or unsaturated, aromatic or nonaromatic, hydrophobic C_4-C_{30} hydrocarbon graft, optionally interrupted by one or more heteroatoms;

(iv) the highly depolymerized polysaccharides comprising at least one saturated or unsaturated,

aromatic or nonaromatic, hydrophobic C₄-C₃₀ hydrocarbon graft, optionally interrupted by one or more heteroatoms.

2. Granules according to the preceding 5 claim, characterized in that the polymer (i) is derived from the polymerization:

- o of at least one monomer of formula (I):

$$(R^1) (R^1) - C = C (R^1) - COOH \quad (I)$$

in which formula the radicals R¹, which are 10 identical or different, represent a hydrogen atom, a C₁-C₁₀ hydrocarbon radical optionally comprising a -COOH group, a -COO- group; and

- o of at least one monomer of formula (III):

$$CH_2 = C (R^3) - C (O) - O - [CH_2 CH (R^4) O]_m - [CH (R^5) - CH_2 O]_n - R^6$$

15 in which formula:

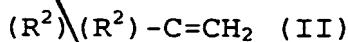
R³ is a hydrogen atom or a methyl radical, R⁴ and R⁵, which are identical or different, represent a hydrogen atom or an alkyl radical containing from 1 to 4 carbon atoms,

20 R⁶ is an alkyl, aryl, alkylaryl or arylalkyl radical containing from 1 to 30, preferably from 8 to 30 carbon atoms,

n is between 2 and 100, preferably between 6 and 100 and m is between 0 and 50, with the proviso 25 that n is greater than or equal to m and their sum is between 2 and 100, preferably between 6 and 100;

and optionally:

- of at least one monomer of formula (II):



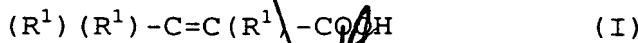
in which formula the radicals R^2 , which are

5 identical or different, represent a hydrogen atom, a linear or branched aliphatic, or cyclic, C_1-C_{10} radical.

3. Granules according to claim 1,

characterized in that the polymer (i) is derived from
10 the polymerization:

- of at least one monomer of formula (I):



in which formula the radicals R^1 , which are identical or different, represent a hydrogen atom, a C_1-C_{10} hydrocarbon radical optionally comprising a $-COOH$ group, a $-COOH$ group; and

- of at least one monomer of formula (II'):

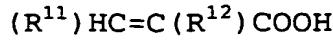


in which formula the radicals R^2 , which are identical or different, represent a hydrogen atom, a linear or branched aliphatic, or cyclic, saturated or ethylenically unsaturated, C_2-C_{10} radical, provided that the two radicals are not hydrogen atoms.

25 4. Granules according to any one of

claims 1 to 3, characterized in that the monomer (I) of the polymer (i) or (ii) is a monocarboxylic or

polycarboxylic acid, or a carboxylic anhydride, corresponding to the following formula:



in which formula:

5 R^{11} represents a hydrogen atom, a -COOH group or a group $-(CH_2)_n-COOH$ in which n is between 1 and 4, a C_1-C_4 alkyl radical; R^{12} represents a hydrogen atom, a group $-(CH_2)_m-COOH$ in which m is between 1 and 4, a C_1-C_4 alkyl radical.

10 5. Granules according to the preceding claim, characterized in that the monomer (I) of the polymer (i) or (ii) is such that the radical R^{11} represents a hydrogen atom, a group -COOH or $-(CH_2)-COOH$, a methyl radical, and the radical R^{12} represents a hydrogen atom, a group $-CH_2-COOH$ or a methyl radical.

15 6. Granules according to any one of claims 4 to 5, characterized in that the monomer (I) of the polymer (i) or (ii) is chosen from acrylic, 20 methacrylic, citraconic, maleic, fumaric, itaconic or crotonic acids or anhydrides.

25 7. Granules according to any one of the preceding claims, characterized in that the monomer (II) is chosen from ethylene, propylene, 1-butene, isobutylene, n-1-pentene, 2-methyl-1-butene, n-1-hexene, 2-methyl-1-pentene, 4-methyl-1-pentene,

2-ethyl-1-butene, diisobutylene, 2-methyl-3,3-dimethyl-1-pentene.

8. Granules according to any one of the preceding claims, characterized in that the monomer 5 (II') is chosen from 1-butene, isobutylene, n-1-pentene, 2-methyl-1-butene, n-1-hexene, 2-methyl-1-pentene, 4-methyl-1-pentene, 2-ethyl-1-butene, diisobutylene and 2-methyl-3,3-dimethyl-1-pentene.

9. Granules according to any one of the 10 preceding claims, characterized in that the monomer (III) is such that R^6 is an alkyl radical containing from 8 to 30 carbon atoms, a phenyl radical substituted with one to three 1-phenylethyl groups, or an alkylphenyl radical in which the alkyl radical contains 15 from 8 to 16 carbon atoms.

10. Granules according to any one of the preceding claims, characterized in that the polymer (i) or (ii) may comprise, in addition, one or more units corresponding to monoethylenically unsaturated nonionic 20 monomers (IV) other than the monomers (II) or (II').

11. Granules according to the preceding claim, characterized in that the monomer (IV) is chosen from:
o vinylaromatic monomers such as styrene,
25 vinyltoluene,

- o C_1-C_{20} alkyl esters of acids which are α - β -ethylenically unsaturated, such as methyl, ethyl or butyl acrylates or methacrylates,
- o vinyl or allyl esters of acids which are α - β -ethylenically unsaturated, such as vinyl or allyl acetates or propionates,
- o vinyl or vinylidene halides such as vinyl or vinylidene chloride,
- o α - β -ethylenically unsaturated nitriles such as acrylonitrile,
- o hydroxyalkyl esters of acids which are α - β -ethylenically unsaturated, such as hydroxyethyl or hydroxypropyl acrylates or methacrylates,
- 15 o α - β -ethylenically unsaturated amides such as acrylamide or methacrylamide.

12. Granules according to any one of the preceding claims, characterized in that the graft is chosen from aliphatic, cyclic, aromatic, alkylaromatic and arylaliphatic radicals comprising 4 to 30 carbon atoms and which may be interrupted by one or more heteroatoms, preferably oxygen.

13. Granules according to any one of the preceding claims, characterized in that the polymer (i) is derived from the polymerization of maleic anhydride and diisobutylene.

14. Granules according to any one of the preceding claims, characterized in that the polypeptides (iii) are chosen from homopolymers and copolymers derived at least from aspartic and glutamic acids.

15. Granules according to any one of the preceding claims, characterized in that the polysaccharides (iv) are chosen from the highly depolymerized compounds obtained from dextran, starch, maltodextrin, xanthan gum and galactomannans, such as guar or carob.

16. Granules according to any one of the preceding claims, characterized in that the nonionic surfactant is chosen from:

- 15 - ethoxylated or ethoxy-propoxylated fatty alcohols
- ethoxylated or ethoxy-propoxylated triglycerides
- ethoxylated or ethoxy-propoxylated fatty acids
- ethoxylated or ethoxy-propoxylated sorbitan esters
- ethoxylated or ethoxy-propoxylated fatty amines
- 20 - ethoxylated or ethoxy-propoxylated di(1-phenyl-ethyl)phenols
- ethoxylated or ethoxy-propoxylated tri(1-phenyl-ethyl)phenols
- ethoxylated or ethoxy-propoxylated alkylphenols.

25 17. Granules according to any one of the preceding claims, characterized in that they may

comprise, in addition, at least one additional ionic surfactant.

18. Granules according to any one of the preceding claims, characterized in that the content of 5 active substance is between 40 and 90 parts by weight in the granule.

19. Granules according to any one of the preceding claims, characterized in that the quantity of 10 nonionic surfactant and of water-soluble or water-dispersible compound varies between 10 and 60 parts by weight in the granule.

20. Granules according to any one of the preceding claims, characterized in that the weight ratio of the concentrations between the nonionic 15 surfactant and the water-soluble or water-dispersible compound is between 50/50 and 90/10.

21. Granules according to any one of the preceding claims, characterized in that the weight ratio of the concentrations between the nonionic 20 surfactant and the additional surfactant(s) is between 5 and 10.

22. Granules according to any one of the preceding claims, characterized in that an emulsion is prepared which comprises 10 to 99% by weight of dry 25 substances, preferably 30 to 80% by weight.

23. Granules according to any one of the preceding claims, characterized in that drying is carried out in an oven, in a thin layer.

24. Granules according to any one of
5 claims 1 to 22, characterized in that spray-drying is
carried out. 

25. Granules according to any one of
claims 1 to 22, characterized in that drying is carried
out by means of a Duprat® drum.

10 26. Granules according to any one of the preceding claims, characterized in that the active substance is chosen from active substances which can be used in the food, detergency, cosmetics, paints, paper, agrochemical and metal-working or -deforming sectors.